We claim:

1. A system for designing a virtual dental model comprising:

a virtual articulator representing a three dimensional model of a patient's upper and lower dental arches including data defining a constraint of motion having a plurality of degrees of freedom between said upper and lower dental arches;

a simulation analyzer to simulate said motion using said three dimensional model and analyze resulting contacts on portions of said upper and lower arches during said movement to provide contact data, said resulting contacts being characterized by a sequence in time of occurrence; and

a designing module to design one of a virtual prosthesis for one of said upper and lower arches and a virtual desired dental modification using said contact data acquired from said simulation analyzer and said virtual articulator.

2. A system as claimed in claim 1, wherein said one of a virtual prosthesis and a virtual desired dental modification are implemented in said three dimensional model to create a modified three dimensional model and said modified three dimensional model is simulated to analyze new resulting contacts.

3. A system as claimed in claim 2, wherein a plurality of modified three dimensional models are created and stored.

4. A system as claimed in claim 1, wherein said resulting contacts are one of points of contact and forces of contact.

5. A system as claimed in claim 4, wherein said resulting contacts are identified by markers with different directions, lengths and colors.

6. A system as claimed in claim 1, further comprising a three-dimensional model generator of a patient's upper and lower dental arches, the generator comprising:

a physical dental model of said upper dental arch and said lower dental arch;

reference markers referenced with respect to said physical lower dental arch model;

reference markers referenced with respect to said physical upper dental arch model;

digitizing means for digitizing said physical upper dental arch along with reference markers referenced with respect to said physical lower dental arch model and for digitizing said physical lower dental arch along with reference markers referenced with respect to said physical upper dental arch model; and

calculating means for calculating transition matrices correlating said upper dental arch and said lower dental arch so as to generate a three-dimensional model.

7. A system as claimed in claim 6, further comprising a fabrication module to fabricate said prosthesis based on a design made by said designing module.

8. A system as claimed in claim 7, wherein said design made by said designing module is chosen from said plurality of modified three dimensional models.

9. A method for determining a satisfactory change to a virtual dental model comprising:

(a) creating a virtual three dimensional dental model including parameters defining a constraint of motion having a plurality of degrees of freedom between an upper and a lower dental arch;

(b) simulating movement of said dental model while respecting said parameters to identify points of contact between portions of an upper and a lower dental arch, said resulting contacts being characterized by a sequence in time of occurrence;

(c) designing a change to said dental model taking into consideration said contact using a computer aided design system; and

(d) repeating as desired steps (b) and (c) to obtain a satisfactory changed dental model.

10. A method as claimed in claim 9, wherein said creating a virtual three dimensional model further comprises creating a virtual three dimensional model with respect to a mechanical articulator.

11. A method as claimed in claim 9, wherein said points of contact are identified by markers with different directions, lengths and colors.

12. A method as claimed in claim 9, further comprising identifying forces of contacts at said points of contact.

13. A method as claimed in claim 9, further comprising correlating an upper dental arch to a lower dental arch, said correlating comprising:

creating a physical dental model of said upper dental arch and said lower dental arch;

digitizing said physical upper dental arch along with reference markers referenced with respect to said physical lower dental arch model;

digitizing said physical lower dental arch along with reference markers with respect to said physical upper dental arch model; and

calculating transition matrices correlating said upper dental arch and said lower dental arch.

14. A method as claimed in claim 9, further comprising fabricating a prosthesis based on said satisfactory changed dental model using a computer-aided fabrication system.

15. A method for correlating an upper dental arch to a lower dental arch comprising:

creating a physical dental model of said upper dental arch and said lower dental arch;

digitizing said physical upper dental arch along with reference markers referenced with respect to said physical lower dental arch model;

digitizing said physical lower dental arch along with reference markers with respect to said physical upper dental arch model; and

calculating transition matrices correlating said upper dental arch and said lower dental arch.

16. A method as claimed in claim 15, further comprising applying a malleable material to said upper dental arch and said lower dental arch so as to create a bite impression of each in a desired occlusion position, said malleable material having said reference markers protruding from said dental model to provide an external referential system; and wherein said digitizing is done with said malleable material and without said malleable material.

17. A method as claimed in claim 15, wherein said reference markers are spheres and said digitizing comprises determining the center and diameter of each of said spheres.

18. A method as claimed in claim 17, wherein each of said spheres have different diameters so as to identify and differentiate them.

19. A method as claimed in claim 16, wherein said reference markers are polyhedrons having at least three faces visible from any point in space.

20. A method as claimed in claim 15, wherein said reference markers provide an external referential system referenced with respect to a mechanical articulator; and further comprising positioning said upper and lower dental arches within a virtual articulator using said external reference system.

21. A method as claimed in claim 20, wherein said virtual articulator has adjustable parameters corresponding to parameters of said mechanical articulator.

22. A method as claimed in claim 20, further comprising compensating for errors introduced by said digitizing by adjusting a virtual upper dental arch with respect to a virtual lower dental arch to a satisfactory occlusion.

23. A computer data signal embodied in a carrier wave comprising data resulting from one of simulating movement of a virtual dental model while respecting motion constraint parameters to identify points of contact between portions of an upper and a lower dental arch and designing a change to said dental model taking into consideration said contact using a computer aided design system.